

Work Order ID 72973



Page 1

Tuesday, August 23, 2011 8:14:47 AM

Item ID: D407-667-105

Accept



Setup Start



Revision ID:

Item Name: Crosstube Fwd

Stop



Start Date: 8/23/2011 Start Qty: 1.00

Required Date: 9/7/2011 Req'd Qty: 1.00



Cust Item ID:

Customer:

Reference:

Approvals: Process Plan:

Date: 8-23-11 Tooling:

Date:

Run Start



QC:

Date: SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D407-667-145

Rev C (DEO)

DSI9565

A

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D407-667-105 CHG004

8/23/11

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

DP

11-8-26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 72973

Tuesday, August 23, 2011 8:14:47 AM



Page 2

Item ID: D407-667-105

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Fwd

Start Date: 8/23/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 9/7/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals:

Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D407-667-145 using CNC bender program 407-fw

JW

11-08-26

130

0.00



QC15- Crosstube Dimensional Check

QC

Memo

0.00

Quality Control

S 8/23/26

64

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 72973

Tuesday, August 23, 2011 8:14:48 AM



Page 3

Item ID: D407-667-105

Accept



Setup Start



Revision ID:

Item Name: Crosstube Fwd

Stop



Start Date: 8/23/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 9/7/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

140



Crosstubes

Crosstubes

0.00

0.00

Memo

1-scrib batch # inside of cuff

2-Drill pilot holes in tube using drill Jig DT8541 & DT8542 as per Dwg D407-667-145. Drill all (3) top holes use drill table jig DT8577 hole #1,#11 to set up towers, as per QSI0010.

3-Drill and Ream all holes in tube to finish size using drill Jig DT8541 & DT8542 as per Dwg D407-667-145 Check dimensions between holes on all four sides.

4-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

5-Drill pilot holes using drill Jig DT8541 & DT8542 as per Dwg 407-667-145. Drill only the top (2) holes.

6-Drill & ream the top (2) holes to finish size using drill Jig DT8541 & DT8542 as per Dwg D407-667-145

7-Drill Fwd rivet holes using drill Jig DT8787FWD as per Dwg D206-667-145. Note: Fwd side has 3x top holes.

8-Drill Aft rivet holes using drill Jig DT8787AFT as per Dwg D407-667-145.

9-C'sink holes as per Dwg D407-667-145. Allow rivet to sit below surface to compensate for paint.

10-Deburr & inspect for surface damage. Repair damage within limits as per

SAD 11-08-29

SAD
11-08-30

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 72973

Tuesday, August 23, 2011 8:14:48 AM



Page 4

Item ID: D407-667-105

Accept



Setup Start



Revision ID:

Item Name: Crosstube Fwd

Stop



Start Date: 8/23/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 9/7/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: Date:

Tooling:

Date:

Stop



QC: Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Dwg D407-667-145

150



HandFXtube

Hand Finishing Crosstubes

Crosstubes Chemical Conversion

0.00

SAD 11-08-70

①

Memo

0.00

160



QC

Quality Control

QC3- Inspect Part Finish

0.00

Sub 1/30

Memo

0.00

170



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Sub 1/30

Memo

0.00

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Page 5

Accept

1
 2
 3
 4
 5
 6
 7
 8
 9
 10
 11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33
 34
 35
 36
 37
 38
 39
 40
 41
 42
 43
 44
 45
 46
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61
 62
 63
 64
 65
 66
 67
 68
 69
 70
 71
 72
 73
 74
 75
 76
 77
 78
 79
 80
 81
 82
 83
 84
 85
 86
 87
 88
 89
 90
 91
 92
 93
 94
 95
 96
 97
 98
 99
 100
 101
 102
 103
 104
 105
 106
 107
 108
 109
 110
 111
 112
 113
 114
 115
 116
 117
 118
 119
 120
 121
 122
 123
 124
 125
 126
 127
 128
 129
 130
 131
 132
 133
 134
 135
 136
 137
 138
 139
 140
 141
 142
 143
 144
 145
 146
 147
 148
 149
 150
 151
 152
 153
 154
 155
 156
 157
 158
 159
 160
 161
 162
 163
 164
 165
 166
 167
 168
 169
 170
 171
 172
 173
 174
 175
 176
 177
 178
 179
 180
 181
 182
 183
 184
 185
 186
 187
 188
 189
 190
 191
 192
 193
 194
 195
 196
 197
 198
 199
 200
 201
 202
 203
 204
 205
 206
 207
 208
 209
 210
 211
 212
 213
 214
 215
 216
 217
 218
 219
 220
 221
 222
 223
 224
 225
 226
 227
 228
 229
 230
 231
 232
 233
 234
 235
 236
 237
 238
 239
 240
 241
 242
 243
 244
 245
 246
 247
 248
 249
 250
 251
 252
 253
 254
 255
 256
 257
 258
 259
 260
 261
 262
 263
 264
 265
 266
 267
 268
 269
 270
 271
 272
 273
 274
 275
 276
 277
 278
 279
 280
 281
 282
 283
 284
 285
 286
 287
 288
 289
 290
 291
 292
 293
 294
 295
 296
 297
 298
 299
 300
 301
 302
 303
 304
 305
 306
 307
 308
 309
 310
 311
 312
 313
 314
 315
 316
 317
 318
 319
 320
 321
 322
 323
 324
 325
 326
 327
 328
 329
 330
 331
 332
 333
 334
 335
 336
 337
 338
 339
 340
 341
 342
 343
 344
 345
 346
 347
 348
 349
 350
 351
 352
 353
 354
 355
 356
 357
 358
 359
 360
 361
 362
 363
 364
 365
 366
 367
 368
 369
 370
 371
 372
 373
 374
 375
 376
 377
 378
 379
 380
 381
 382
 383
 384
 385
 386
 387
 388
 389
 390
 391
 392
 393
 394
 395
 396
 397
 398
 399
 400
 401
 402
 403
 404
 405
 406
 407
 408
 409
 410
 411
 412
 413
 414
 415
 416
 417
 418
 419
 420
 421
 422
 423
 424
 425
 426
 427
 428
 429
 430
 431
 432
 433
 434
 435
 436
 437
 438
 439
 440
 441
 442
 443
 444
 445
 446
 447
 448
 449
 450
 451
 452
 453
 454
 455
 456
 457
 458
 459
 460
 461
 462
 463
 464
 465
 466
 467
 468
 469
 470
 471
 472
 473
 474
 475
 476
 477
 478
 479
 480
 481
 482
 483
 484
 485
 486
 487
 488
 489
 490
 491
 492
 493
 494
 495
 496
 497
 498
 499
 500
 501
 502
 503
 504
 505
 506
 507
 508
 509
 510
 511
 512
 513
 514
 515
 516
 517
 518
 519
 520
 521
 522
 523
 524
 525

Setup Start

Stop

██████████

Cust Item ID:

Customer:

Reference:

Run Start

Tooling:

Date:

SPC (Y/N):

Date:

Stop

**Insp.
Stamp**

0.00



Memo

0.00

OUTSIDE SERVICE -CROSSTUBES
Liquid Penetrant Inspection as per QSI 038 Or
Issue P/O: 14831 LPI as per ASTM 1417
Level 2 Attach copy of NDT results to work order

0.00

[illegible]

Packaging

Packaging

Packaging

Memo

0.00

Inspect for transit damage
Ensure copy of NDT results attached to work order.

QC5- Inspect part completeness to step on W/O

0,00

1. The first step in the process is to identify the problem. This involves gathering information about the situation and the people involved.

QC

Quality Control

Memo

0.00

Inspect for damage & ensure results are as per Dwg D206-667-145

CL 11/09/06(1)

24/5/6

11 09 07 C

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 72973

Tuesday, August 23, 2011 8:14:48 AM



Page 6

Item ID: D407-667-105

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Fwd

Start Date: 8/23/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 9/7/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

210

0.00



SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: 7:30

Finish Time: 9:00

PAINT:

Start Time: 10:00

Finish Time: 2:30

Handwritten notes: 11, 09, 07, 1

220

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

Quality Control

Then, Wrap in plastic bag to protect from scratches

Handwritten note: 8 ulozki

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____
Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 72973

Tuesday, August 23, 2011 8:14:48 AM



Page 7

Item ID: D407-667-105

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Fwd

Start Date: 8/23/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 9/7/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

230



Crosstubes

Crosstubes

Crosstubes

Memo

0.00

1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe

2-Install supports with Proseal 890 per DS19565 and QSI 015

A/R Proseal 890 Batch: 118234

3- Torque bolts as per dwg

4-Install nut plates as per Dwg D407-667-145. Touch-up rivet heads with Imron paint.

→ 11.09.24 ①

11 09 13 ①

240



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

8 11/02/21

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 72973

Tuesday, August 23, 2011 8:14:48 AM



Page 8

Item ID: D407-667-105

Accept



Setup Start



Revision ID:

Item Name: Crosstube Fwd

Stop



Start Date: 8/23/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 9/7/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

250

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

11/9/21

260

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

8/16/22

@

270

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D407-667-105

Location:

PPP Rev:

D

Per 8/22

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 72973

Tuesday, August 23, 2011 8:14:48 AM

Page 9

Item ID: D407-667-105

Accept

Revision ID:

Item Name: Crosstube Fwd

Start Date: 8/23/2011 Start Qty: 1.00

Required Date: 9/7/2011 Req'd Qty: 1.00

Reference:

Approvals: Process Plan: Date:

QC: Date:

Tooling: Date:

SPC (Y/N): Date:

Run Start

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

u/9/27 J

MF
11-09-22

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Tuesday, August 23, 2011 8:14:54 AM

Page 1

Work Order ID: 72973

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Start Date: 8/23/2011

Required Date: 9/7/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:F 05.09.01Add holes for compatibility with Bell Skidtubes: IKJ/JLM
 IPP Rev:G 08-05-16 chg QC6 to QC15 DD verified by:EC
 IPP Rev:H 08-06-03 update as per DSI9415 (ECN1198) DD verified by:ec
 IPP Rev:I 08-07-14 add (scribe inside of tube) seq.6 DD verified by:EC
 IPP Rev:J 08-07-28 update as per (par 08-013) DD verified by:EC
 IPP Rev K 09.01.06 ECN 08-562 EC verified by:DD IPP REV:L
 11.08.05 PER ECN 11-615 DD VERF:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D407-667-105TRN Manufactured No



Crosstube Turning Detail

D2873-043 Manufactured No



Nut Plate Assembly

B# 72644

B72593

Location

Loc Qty

Loc Code

LG

8

72248

8

D2873-045 Manufactured No



Nut Plate Assembly

Location

Loc Qty

Loc Code

LG

23

71983

3

72562

20

D2891-I Manufactured No



2.25 Support

Location

Loc Qty

Loc Code

LG

19

71991

19

① 11-8-26

11-09-21

11-09-21

11-09-13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Tuesday, August 23, 2011 8:14:54 AM

Page 2

Work Order ID: 72973

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Start Date: 8/23/2011

Required Date: 9/7/2011

Start Qty: 1.00

Required Qty: 1.00

D3595-063-395

Manufactured No

230

Each

93.0000

4

4



RUBBER CUSHION



m 11-09-13

Location

Loc Qty

Loc Code

LG

92

70975

92

LG055

1

63368

1

MS20601-AD4W10

Purchased

No

230

Each

91.0000

14

14



RIVET



m 11-09-21

Location

Loc Qty

Loc Code

LG051

91

116186

3

117676

2

118464

86

MS21920-20

Purchased

No

230

Each

102.0000

4

4



Clamp (per MIL-DTL-8783C)



m 11-09-13

Location

Loc Qty

Loc Code

LG050

102

116799

10

118236

42

118649

50

Tuesday, August 23, 2011 8:14:54 AM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Tuesday, August 23, 2011 8:14:54 AM

Page 3

Work Order ID: 72973

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Start Date: 8/23/2011

Required Date: 9/7/2011

Start Qty: 1.00

Required Qty: 1.00

AN5-10A

Purchased

No

250

Each

216.0000

10

10

Bolt

Location

Loc Qty

Loc Code

ST337

216

116704

16

117795

125

118191

59

118422

16

AN5-30A

Purchased

No

250

Each

60.0000

4

4

BOLT

Location

Loc Qty

Loc Code

ST339

60

116003

2

117514

13

118191

25

118451

20

AN5-32A

Purchased

No

250

Each

222.0000

4

4

Bolt

Location

Loc Qty

Loc Code

ST339

50

118628

50

ST340

172

117161

1

117514

11

117872

60

118191

50

118422

50

Tuesday, August 23, 2011 8:14:54 AM

Shop Packet Print

Page 3

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Tuesday, August 23, 2011 8:14:54 AM

Page 4

Work Order ID: 72973

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Start Date: 8/23/2011

Required Date: 9/7/2011

Start Qty: 1.00

Required Qty: 1.00

AN960JD516

NAS1149D0563J

Purchased

No

250

Each

0.0000

18

18

Washer

MS21042L5

Purchased

No

250

Each

1,185.000

4

4

Nut

Location

Loc Qty

Loc Code

ST300

1185

116105

5

116548

53

117441

498

117591

43

117611

90

118179

496

M11820 6 SP
11821 SP

4

Tuesday, August 23, 2011 8:14:55 AM

Shop Packet Print

Page 4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

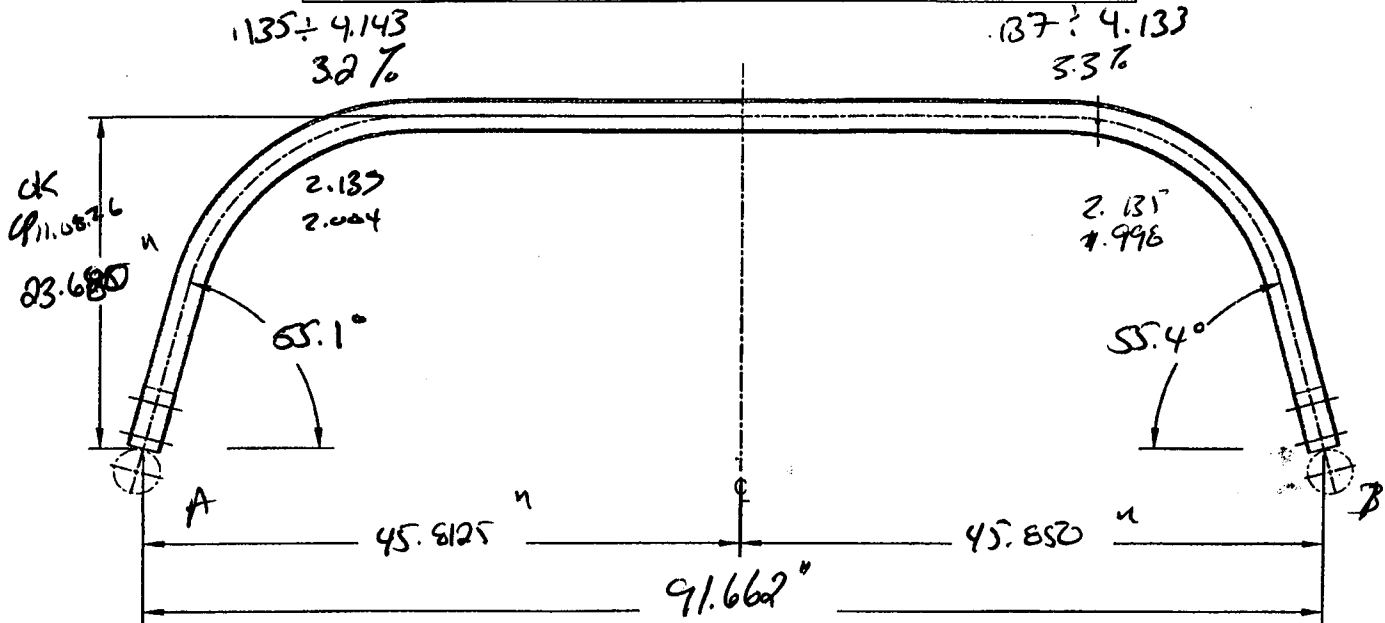
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	72973
Description: Crosstube High Fwd (407)		Part Number:	D407-667-105
Inspection Dwg: D407-667-145 Rev: C		Page 1 of 1	

Required Dimension	Min	Max
Height	23.41	23.67
1/2 Span	45.81	46.07
Angle	54	56
Total Span	91.63	92.13



Comments
SIDE A = 32% crushing @ 17 Passes
SIDE B = 33% crushing @ 15 Passes
Bent high. Acceptable. $11.08.26$ DS 642

QC15 Inspection	δ
Date	$11/08/26$

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.11.12	Dimensions updated per Dwg Rev C	KJ	

Item	Qty	Part Number	Description
	-145		
1	X	D407-667-145	CROSSTUBE ASSEMBLY (407 HIGH FWD)
2	1	D6010-115	CROSSTUBE
3	2	D2873-043	NUT PLATE
4	2	D2873-045	NUT PLATE
5	2	D2891-1	SUPPORT
6	4	D3595-063-395	RUBBER CUSHION
7	4	MS21920-20	CLAMP (OR MS21920-21)
8	14	MS20601AD4W10	RIVET (OR NAS9302B-4-10)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6010-115
FINISHED LENGTH = 113.20±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-145" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 17.8 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-20 CLAMPS (OR -21) WITH D3595-063-395 RUBBER CUSHIONS TO SECURE THE D2891-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMP MECHANISMS ARE LOCATED ON CROSSTUBE SUPPORTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 72973

11-08-23

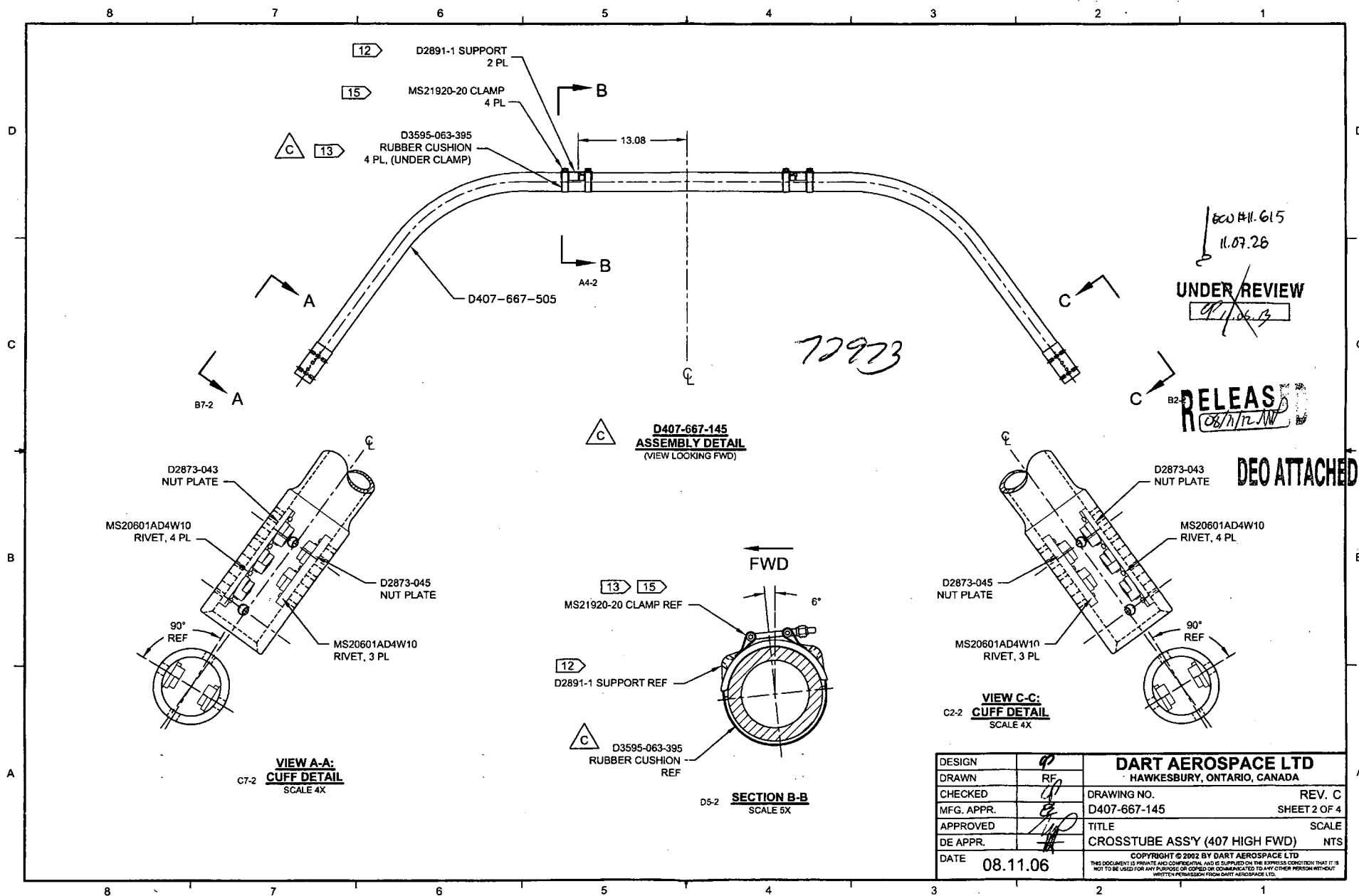
DEO ATTACHED

ECW #11-615
11.07.26

UNDER REVIEW

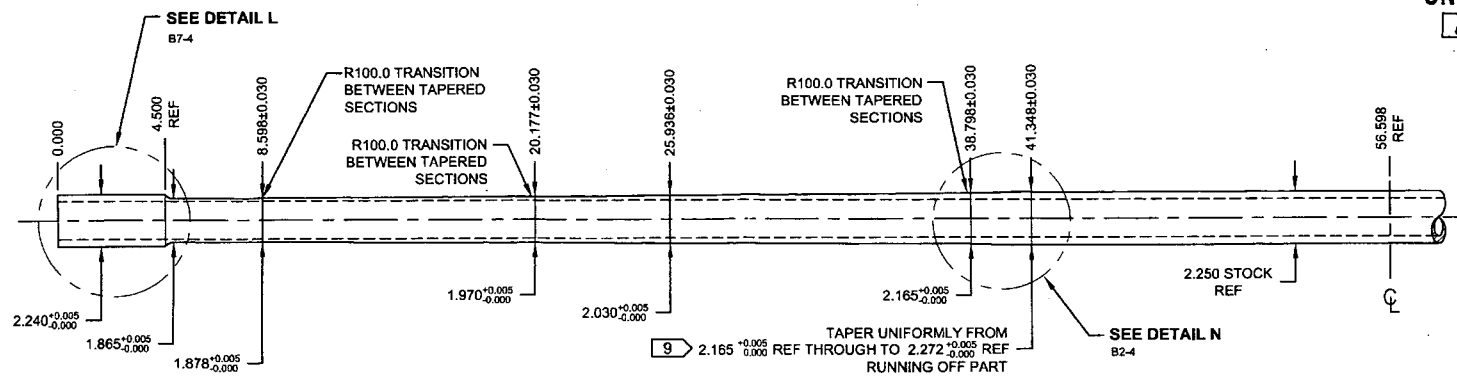
RELEASED
08/11/12

C	REVISE GENERAL NOTES/PART LIST (ZN D7-1); REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. D3595-063-395 WAS D2856-400-694 (ZN D6-2 & A5-2); REMOVED R.F. 7 ADD TOLERANCES (ZN C6-3, C4-3, D2-3); RELOCATED FLAG #6 (ZN A8-3) PER NCR 210; MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	08.11.06
B	ADD HOLES AND NUT PLATES FOR COMPATABILITY WITH BHT/AA SKUDTUBES	PH	05.07.26
A	NEW ISSUE	CP	02.05.08
REV.	DESCRIPTION	BY	DATE
DESIGN	<u>RF</u>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	<u>RF</u>	DRAWING NO.	REV. C
CHECKED	<u>RF</u>	D407-667-145	SHEET 1 OF 4
MFG. APPR.	<u>RF</u>	TITLE	SCALE
APPROVED	<u>RF</u>	CROSSTUBE ASS'Y (407 HIGH FWD)	NTS
DE APPR.	<u>RF</u>	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DATE	08.11.06		



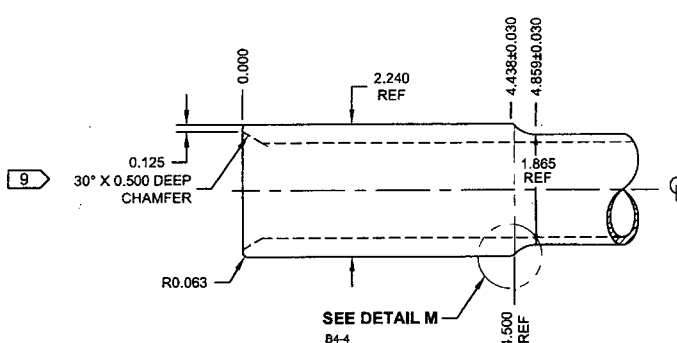
UNDER REVIEW

CP 11.06.13
BOW HILL 615
1.07.26

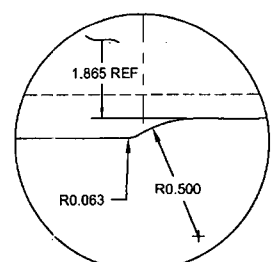


C TURNING DETAIL

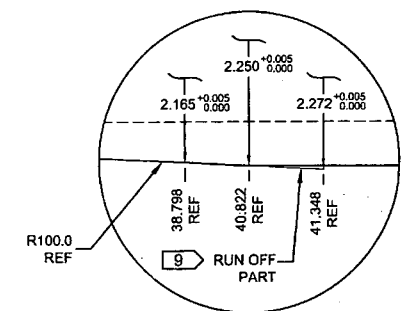
72923



**DETAIL L:
CROSSTUBE CUFF**
D7-4 NOT TO SCALE



**DETAIL M:
CUFF TRANSITION**
D6-4 NOT TO SCALE



**DETAIL N:
TAPER RUN-OFF**
C3-4 NOT TO SCALE

DEO ATTACHED

RELEASED
08/11/2006

DESIGN	9	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	CP	DRAWING NO.	REV. C
MFG. APPR.	CP	D407-667-145	SHEET 4 OF 4
APPROVED	CP	TITLE	SCALE
DE APPR.	CP	CROSSTUBE ASS'Y (407 HIGH FWD)	NTS
DATE	08.11.06	<small>COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

DRAWING NO. D407-667-145	TITLE CROSSTUBE ASS'Y (407 HIGH FWD)	REV. C	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D407-667-145-C-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>q</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>IB</i>	APPROVED <i>WD</i>		DE APPR. <i>#</i>		
DATE 11.07.15	DATE 11.07.22	DATE 11.07.22	DATE 11/07/22		DATE 11.07.21		

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

Item	Qty -145	Part Number	Description
9	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	----------------	---

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2891-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-07-28
WD

REFERENCE ONLY**5.0 PARTS LIST****5.1 HIGH GEAR CROSSTUBES**

Item	Qty -101	Qty -201	Qty -103	Qty -203	Qty -105	Qty -205	Part Number	Description
	X						D206-667-101	CROSSTUBE INSTALLATION, 206A/B HIGH FWD
		X					D206-667-201	CROSSTUBE INSTALLATION, 206A/B HIGH AFT
			X				D206-667-103	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH FWD
				X			D206-667-203	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH AFT
					X		D407-667-105	CROSSTUBE INSTALLATION, 407 HIGH FWD
						X	D407-667-205	CROSSTUBE INSTALLATION, 407 HIGH AFT
1	1						D206-667-141	CROSSTUBE ASSEMBLY, 206A/B HIGH FWD
2		1					D206-667-241	CROSSTUBE ASSEMBLY, 206A/B HIGH AFT
3			1				D206-667-143	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH FWD
4				1			D206-667-243	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH AFT
5					1		D407-667-145	CROSSTUBE ASSEMBLY, 407 HIGH FWD
6						1	D407-667-245	CROSSTUBE ASSEMBLY, 407 HIGH AFT
10	*2	*2	*2		*2		D2891-1	SUPPORT
11				*2			D2892-1	SUPPORT
12						*1	D2894-1	SUPPORT
13	*4	*4	*4		*4		D3595-063-395	RUBBER CUSHION
14				*4			D3595-063-450	RUBBER CUSHION
15						*2	D3595-075-430	RUBBER CUSHION
16	*4	*4	*4		*4		MS21920-20	CLAMP
17				*4		*4	MS21920-22	CLAMP
18						*2	MS21920-25	CLAMP (OR MS21920-24)
19	4	4	4		4		AN5-32A	BOLT
20				4		4	AN5-34A	BOLT
21	4	4	4	4	4	4	MS21042L5	NUT (OR MS21042-5)
22	8	8	8	8	8	8	NAS1149C0563J	WASHER (OR AN960JD516)
23						*2	D3190-1	CHAFING SHIELD
40	*2		*2	*2	*2	*2	D2873-043	NUT PLATE
41	*2		*2	*2	*2	*2	D2873-045	NUT PLATE
42		2					D2872-043	NUT PLATE
43		2					D2872-045	NUT PLATE
44	10		10				AN5-7A	BOLT
45		10		10	10	10	AN5-10A	BOLT
46	4	10	4		4		AN5-30A	BOLT
47				4		4	AN5-32A	BOLT
48			12				AN970-4	WASHER (OPTIONAL)
49		6					MS21042L5	NUT (OR MS21042-5)
50	10	12	10	10	10	10	NAS1149C0563J	WASHER (OR AN960JD516)
60		1					D3039-3	CENTER DRILL (TOOLING, NOT INSTALLED)

*REFERENCE ONLY. PARTS ARE INCLUDED IN D206-667-141/-143/-241/-243 & D407-667-145/-245
ASSEMBLIES ABOVE

• COPYRIGHT © 2001 BY DART AEROSPACE LTD. •
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED
OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

Revision: D

Date: 11.05.01



ACUREN

RAPPORT D'INSPECTION PAR RESSUAGE

P. 12619

PAGE 1 DE 1

CLIENT DART AEROSPACE DATE 2011-09-06 HEURE ☒ AM ☐ PM
 ATTENTION LINDA N° TRAVAIL 188-11-02352
 ACUREN
 ADRESSE 1270 ABERDEEN ST N° CLIENT PO/WO 34551 [14831]
HAUKES BURY, ONT. K6A 1K7 SITE DE TRAVAIL SHOP
 PROJET ACCEPTATION STD. ASTM E1417-05 DATE/REV. 05 (No cracks)
 ITEM(S) EXAMINÉ 4 X-TUBES

DESCRIPTION DES TRAVAUX N° PROCÉDURE LT-2002F DATE/REV. 2005 N° TECHNIQUE LT-X-XXX-XXX DATE/REV. 2005

N° ITEMS MATÉRIEL ÉPAISSEUR VARIABLE
 DESCRIPTION INSPECTION EN 100% OF SURFACE (EXT.) OF 4 CROSS TUBES BY F.P.I.

DÉTAILS DES INSPECTIONS

MÉTHODE : ☒ FLUORESCENT ☐ VISIBLE ☐ LAVABLE À L'EAU ☐ MÉTHODE DISSOLVANT ☐ PRÉ-ÉMULSIONNANT
 MARQUE : MAGNA Flux LUM. NOIRE S/N 5M40493 PUISS. > 1 000 µ W/cm² ☐ AMBIANT < 2 fc
 PÉNÉTRANT : 2L-27A TEMPS PÉNÉTRATION MIN. 10 MIN. ÉQUIP. LUMIÈRE ☐ LAMP. POCHÉ ☐ LAMP. CULASSE ☐ PUISS. > 100 fc @ SURFACE
 DISSOLVANT PÉNÉTRANT SK-5 TEMPS SÉCHAGE MIN. > 10 MIN. AUTRES
 RÉVÉLATEUR TEMPS RÉVÉLATION MIN. 10 MIN. MÈTRE LUM. N/S DATE CAL DUE
 TYPE RÉVÉLATEUR ☒ NON AQUEUX ☐ AQUEUX ☐ SEC

SURFACE INSPECTÉE

CONDITION SURFACE ☐ MEULÉE ☐ SOUDÉE ☐ MACHINÉE ☐ MRENAILLÉE ☒ MÉTAL PROPRE
 TEMPÉRATURE SURFACE ☐ < - 4°C/20°F ☐ - 4°C/20°F À 10° C/50°F ☒ 10°C/50°F À 52°C/125°F ☐ > 52°C/125°F

RÉSULTATS (☐ MÉTRIQUE ☐ IMPÉRIALE)

ITEM	COMMENTAIRES	ACCEPTÉ	REJETÉ
1	WO. 72262 ITEM: D407-667-205 ✓		
1	WO. 72261 ITEM: D407-667-205 ✓		
1	WO. 69958 ITEM: D407-667-205 ✓		
1	WO. 72973 ITEM: D407-667-105 ✓		

Étendue des Services

L'entente selon laquelle le Groupe Acuren Inc. Exécute les services ne concerne que les énoncés par écrit. En aucune circonstance ces services ne s'étendent au-delà de l'exécution des services demandés. Il est entendu que toutes les descriptions, les observations et les expressions d'opinions faites par Acuren reflètent les opinions ou les observations de l'entreprise fondées sur l'information et les hypothèses fournies par le propriétaire/opérateur, et elles ne constituent pas des déclarations ou des garanties ou ne peuvent être interprétées comme constituant. Le Groupe Acuren Inc. N'assume aucune des responsabilités du propriétaire/opérateur, et le propriétaire/opérateur conserve la responsabilité entière des décisions prises en matière d'ingénierie, de fabrication, de réparation et d'usage à partir de l'information ou des données fournies par Acuren en rapport avec les services décrits dans les présentes ne peuvent excéder le coût des services rendus.

Norme de Diligence

Dans l'exécution des services, le Groupe Acuren Inc. Applique le degré de diligence, le soin et la compétence normalement exercés dans des circonstances semblables par d'autres fournisseurs de ce type de services opérant dans la même localité ou dans une localité similaire. Aucune autre garantie, implicite ou explicite, n'est faite ou voulue par le Groupe Acuren Inc.

SIGNATURES

REPRÉSENTANT Matthew Murdoch FTJ#:
 TECHNICIEN (SIGNATURE): David P. G. N. RAPPORT
 NOM (MOULÉ): David P. G. N. RÉVISÉ PAR:
 1^{er} TECHNICIEN 2nd TECHNICIEN
 ONGC NIVEAU 2 SNT NIVEAU _____ ONGC NIVEAU _____ SNT NIVEAU _____
 ONGC N° REGISTRATION 11611 ONGC N° REGISTRATION _____